



Ultraviolet spectra (the thin lines) reveal presence of hot objects that may be due to a black hole.

NASA

of our galaxy is a strong source of radio waves, which led to the suspicion of a black hole, but a Naval Research Laboratory rocket found no evidence of X-rays from Sagittarius A West, the major radio source. Although there are ways to have a black hole without the customary X-ray emission, Friedman says, "The NRL study of the galactic center offers no support for the idea of a massive black hole."

The nearest nonsatellite galaxy to our own is the Andromeda spiral. George Caruthers of NRL looked at the center of the Andromeda galaxy in the ultraviolet, seeking a bright center that might be evidence of black hole activity and found none. So the galaxy count is one maybe yes, two maybe no.

That's the point. It's always maybe. On the globular clusters Gursky cautions that

further studies of the dynamics of the stars and how they orbit the centers of the clusters are necessary. The astronomers who observed M87 are very cautious and precise in everything they say, and their colleagues, though respectful of the work, are not organizing any parades. Asking around at a meeting of people interested in quasars, SCIENCE NEWS was told, "It depends on how they used the virial theorem," which, translated, amounts to a more complex version of Gursky's caveat.

Yet in their heart of hearts, each observing group involved in these searches would like to be the one to come home with what Friedman calls "conclusive evidence." Only what will it conclude? Given that a black hole can never be directly seen, what data will convince the majority of astronomers? And will it ever come? □

Enigmatic magma in the Pacific

"You can't always get what you want," say the lyrics of a well-known rock song, "but if you try sometimes, you just might find you get what you need."

The Rolling Stones weren't talking about science, but they could have been — as researchers of the *Glomar Challenger's* most recent voyage will tell you. The scientists on Leg 61 of the Deep Sea Drilling Project didn't get what they wanted, but, true to the song, they got what they needed — a find that "may well be the major enigma in plate tectonics theory and western Pacific geology" of the next several years, according to co-chief scientist Roger L. Larson.

The purpose of the cruise was fairly routine. Well-substantiated magnetic anomaly mapping of the Nauru Basin near the Marshall and Caroline islands predicted that sediments and ocean crust dating to the Late Jurassic (about 150 million years ago) existed there. Researchers picked the basin as a perfect spot to retrieve a continuous fossil and sediment record of the equatorial Pacific Ocean Basin and to sample the old, rapidly generated ocean crust. Drilling at only a single

site, they ground through the expected layers of chert, clay, sandstone and black shales, anticipating only more sediment before striking crust. Instead, the *Challenger's* drill dug through 500 meters of a "huge, completely unexpected volcanic structure."

The 100-million-year-old volcanic complex—a mixture of basaltic sills, flows and volcanic sediments—represents a geologically quick (lasting about 10 million years) outpouring of magma that may cover the entire 500-by-1,000-kilometer basin. Mid to late Cretaceous sediment deposits from the nearby island reefs coincide in age with the volcanic complex, disputing the islands' supposed formation about 50 million years ago. This indicates, says Larson, that the "volcanic underpinning [of the islands] is the result of the culmination of this volcanic event."

More fundamental than pondering the islands' origin, researchers have to explain how the huge pile of mid-Cretaceous basalt got there. Similar intrusive sills are found throughout the Pacific, Larson says, but they range only 1 to 10 meters thick and are easily detected because they dis-

rupt the underlying layers' magnetic signal. A volcanic outpouring of such size should have reheated the crust, allowing the realignment of the magnetic anomaly pattern, and should also have physically dislocated the underlying rock. But this magma mass did neither, and its uniform magnetic anomaly pattern amidst the Late Jurassic signal made it "invisible" to the magnetometer.

Larson says there are no clues as yet to explain the way the complex got there without disturbing the magnetic signal, but it seems, he says, that "you have to bring [the magma] through the Jurassic basement." Any model will have to meet peculiar thermal requirements.

As for Leg 61's original, frustrated effort: "It's always nice to find what you predicted," Larson says. "But this is how you keep your strength up in this business. . . . You might not look so smart in that you didn't predict it, but you found something new, . . . completely unexpected." □

They want to be alone

Back in the days when radio astronomy was new, people interested in the possibility of intelligent life on other planets suggested using radio telescopes to look for evidence of such life. The suggestion was that such intelligent beings might be looking for company and sending out signals. It was proposed that such signals might come on the frequency naturally emitted by atomic hydrogen. Clouds of atomic hydrogen pervade the galaxy, and it was reasoned that any civilization with radio astronomy would have found the 21-centimeter radiation and have receivers tuned to it.

A number of searches have been made under such an assumption, all negative. The most recent, which looked at 200 stars near to us and similar to the sun (the most likely kind of stars for having planets) with the earth's most sensitive radio receiver, the Arecibo radio telescope, has found no evidence of such signals, Paul Horowitz of Harvard University reports in the Aug. 25 SCIENCE.

The search was made under the assumption that any interested aliens would be beaming a recognition signal toward our sun and that they would be doing it at a frequency suitably redshifted so that it would reach our receivers at that of atomic hydrogen at rest in the laboratory. It thus appears that there is no evidence for creatures that are doing this on those 200 putative solar systems. That may mean there are no creatures. Or it may mean that they are not intelligent enough to know about radio, or they are not interested in sending recognition signals to particular stars. Or maybe they have chosen not to broadcast at all. Maybe they just want to be left alone in their suite in the cosmic Grand Hotel. □